

Flight Scientist Report
Friday 4/2/2021 ACTIVATE RF61

Flight Type: Statistical Survey Flight

Flight Route: KLF1 KECG OXANA 3245N07145W OXANA KECG KLF1

Special Notes: 2nd flight of a 2 flight day. These are some unique cold air outbreak conditions where the strength of the CAO index values is thought to be closer to coast than usual. Both flights today are flying the exact same path with more dropsondes than normal to really try to capture spatial and diurnal atmospheric behavior.

King Air

Pilot report (Sandeem): (Same description of flight strategy as RF60 report so we won't repeat it here).

Second flight followed the same profile and encountered very similar weather, so the description is very similar, except that the QNC was switched to Seaman and the flight experienced RSP problems. The RSP was degraded and not functioning for most, if not all, of the flight, and chat did not function for the majority of the flight. QNC attempted to troubleshoot the system, but was unable to fix the RSP. Pending post-flight data analysis, problems will be determined and the quality of the additional data will be analyzed.

Flight scientist report (Seaman): RF061 (sortie # 2 of 4/2/2021) on the UC12 was a statistical survey joint flight with the HU25 Falcon. The UC-12 took off from KLF1 approx. 13:25 EST, and executed the same plan as RF060: KLF1, KECG, OXANA, 324N07145W OXANA KECG KLF1.

A total of 9 sondes were dropped. The initial plan was for 8 drops, and an additional sonde about $\frac{3}{4}$ of the from the turn heading back to OXANA as was done in sortie 1 (RF060).

Shane Seaman was the operator for HSRL-2, RSP, drop sondes, and the cameras.

RSP did not work for any of the flight. The iridium chat only worked for the last 30 minutes or so of the flight. Troubleshooting of RSP was attempted, but multiple restarts of hardware and software did not correct the issue. When testing on the ground after the plane was fully powered down, brought into the hangar, and put on a power cart, RSP appeared to be working again.

Falcon

Pilot report (Delaney):

Takeoff: 1332 Land: 1704 Flight Time: 3.5

Science flight for the HU-25 in support of ACTIVATE Campaign #3, conducted cooperatively with the UC-12. Departed Rwy26 to ECG climbing to 5k ft MSL for initial transit. Research profiles

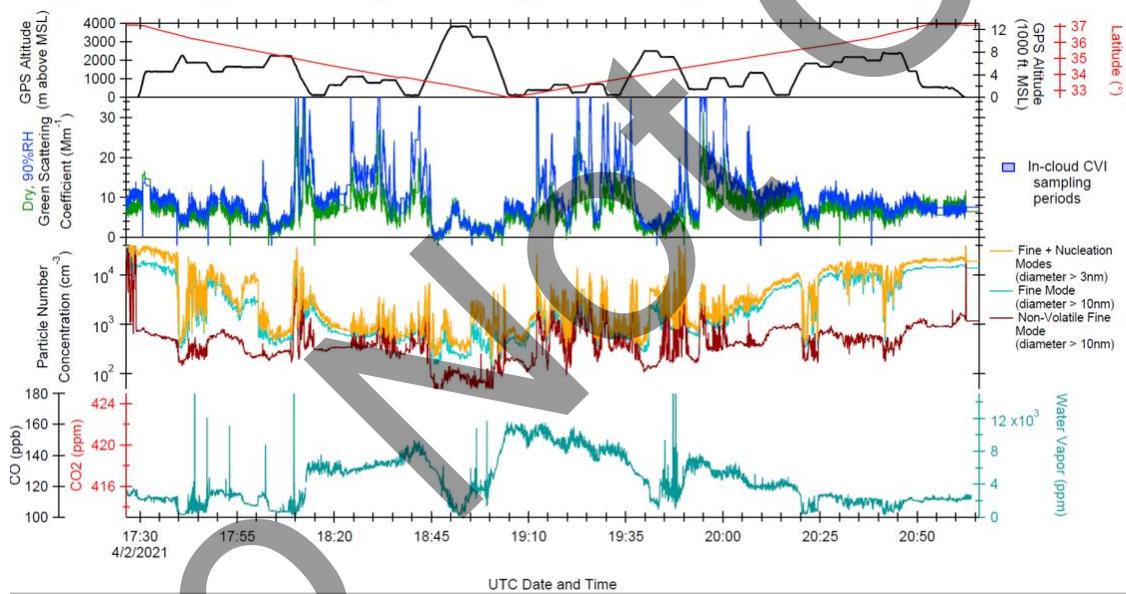
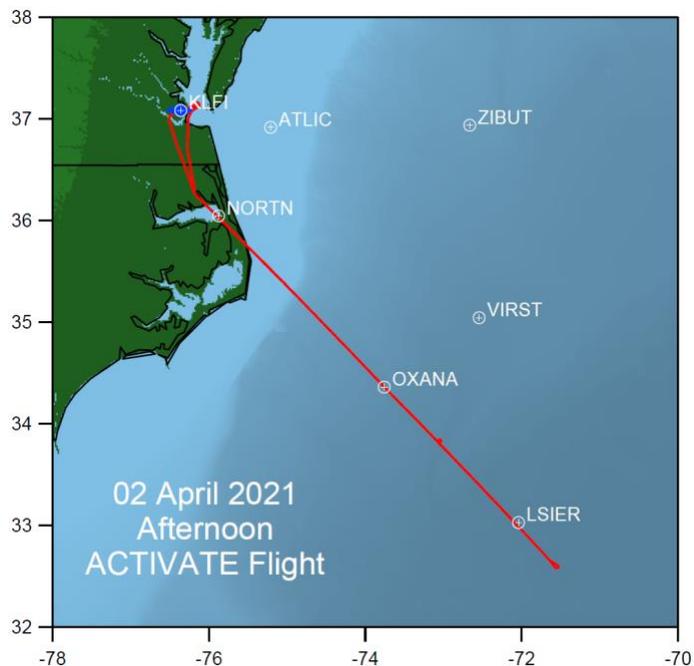
conducted from KLF1-ECG-OXANA-3245N/07145W-OXANA-ECG-KLF1. Winds were light (~20 knots) from the Northwest throughout the majority of flight altitudes with a scattered layer initially encountered at ~5-7 k FT MSL (around ECG), followed by more complex layers increasing in thickness approaching OXANA and extending out to the turn-point. Predominantly all cloudy-based modules conducted throughout the flight, ranging from 500 – 11,500 FT MSL. Some occasional light icing was encountered during cloud penetrations above the freezing level, and continuous light-chop turbulence was present at nearly all altitudes. Aircraft geolocation was within 10 nmi throughout the sortie, with a descending 360 deg turn just past OXANA during a minimum altitude run setup (for timing adjustment) and an extension beyond the turn-point (~10 nmi) during a BCB profile for geolocation compensation. All objectives were achieved and no system discrepancies were noted - pending post-flight data analysis. After completion of this flight, the aircraft entered a maintenance status and commenced electrical modification to support follow-on campaigns.

Pilots: Elder/Delaney

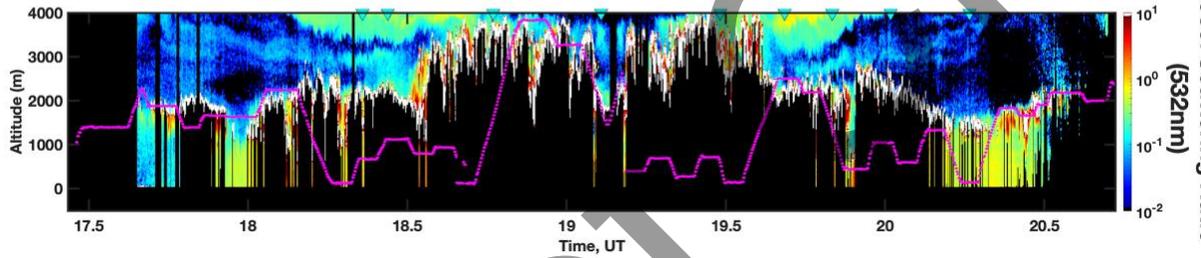
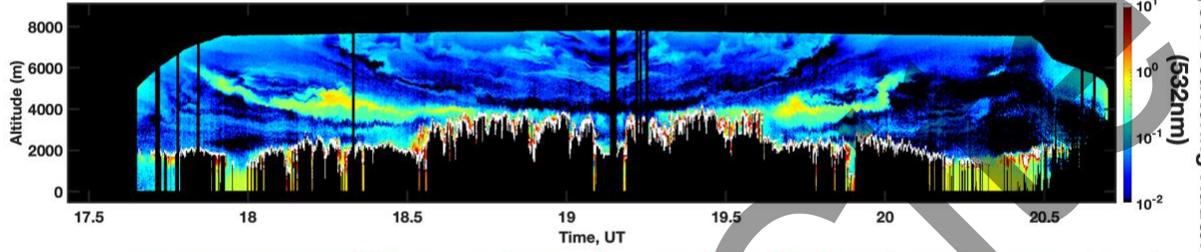
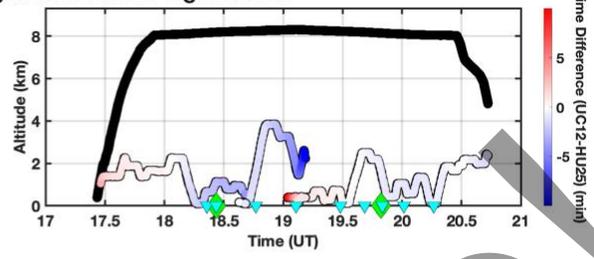
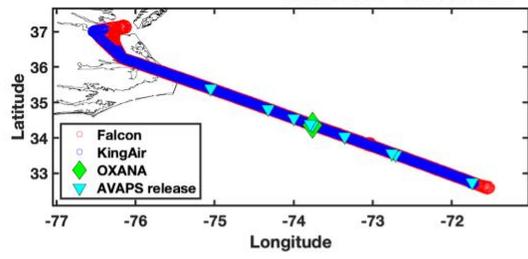
QNCs: Crosbie/Winstead

Flight scientist report (Crosbie): (same one as RF60)

- Deep, cold air outbreak conditions
- Cumulus clouds were present over land in addition to the marine clouds, the cumulus built during the day and was a bit more widespread in the second flight. A reduction in the cloud base was observed from Langley to OBX coastline.
- Clouds thickened rapidly offshore within the first 10 km, and eventually transitioned to a stratiform shield that had tops between 8000 and 11000 ft MSL. Mixed phase microphysics were observed in the cold sections of the cloud. Even shallow cumulus closer to shore contained some evidence of ice particles. The melting level was quite close to cloud base further to the SE and widespread sub cloud rain/drizzle was observed. A marked reduction in the Nd was observed downwind.
- Icing was generally not a concern during the first flight but on the second flight, the first descent over water took place in a particularly thick section of the cloud at around the minimum in cloud top temperature and caused significant icing on the instrumentation resulting in loss of functionality in the TAT probe which appeared to persist beyond the time when the ice was cleared.



20210402 - ACTIVATE - KingAir and Falcon flight tracks



Aerosol scattering ratio (532nm)

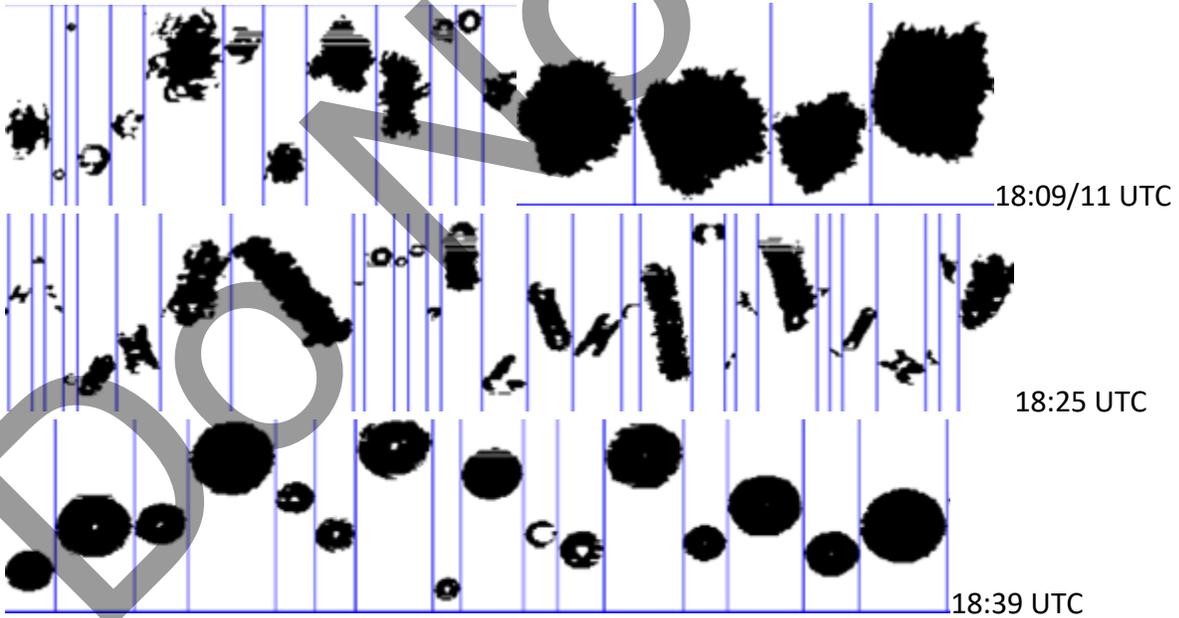
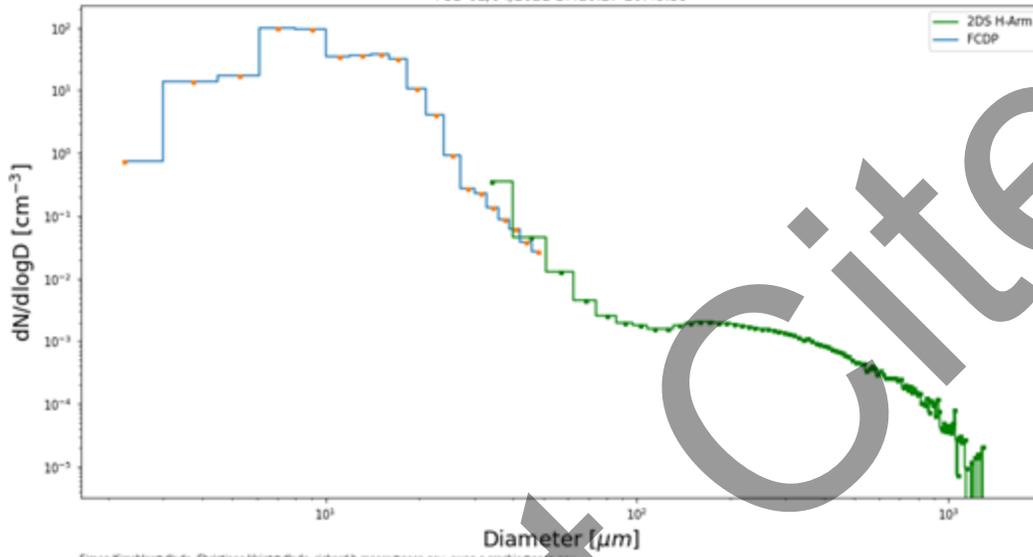
DO NOT

PSD ACTIVATE

preliminary data, only for quicklook use
Simon Kirschler, Christiane Voigt, Richard Moore, Ewan Crosbie



PSD 02/04/2021 17:16:27-20:45:39

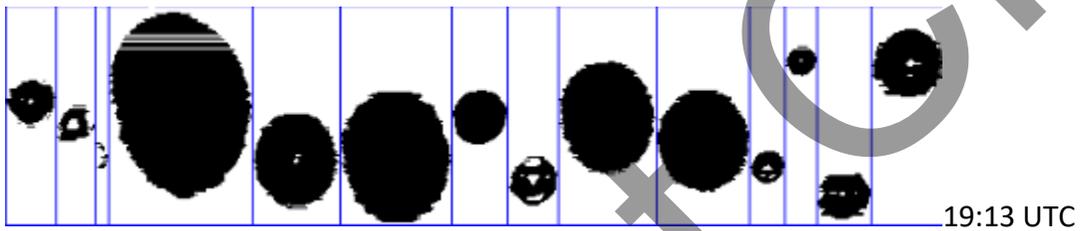




18:45 UTC



18:54 UTC

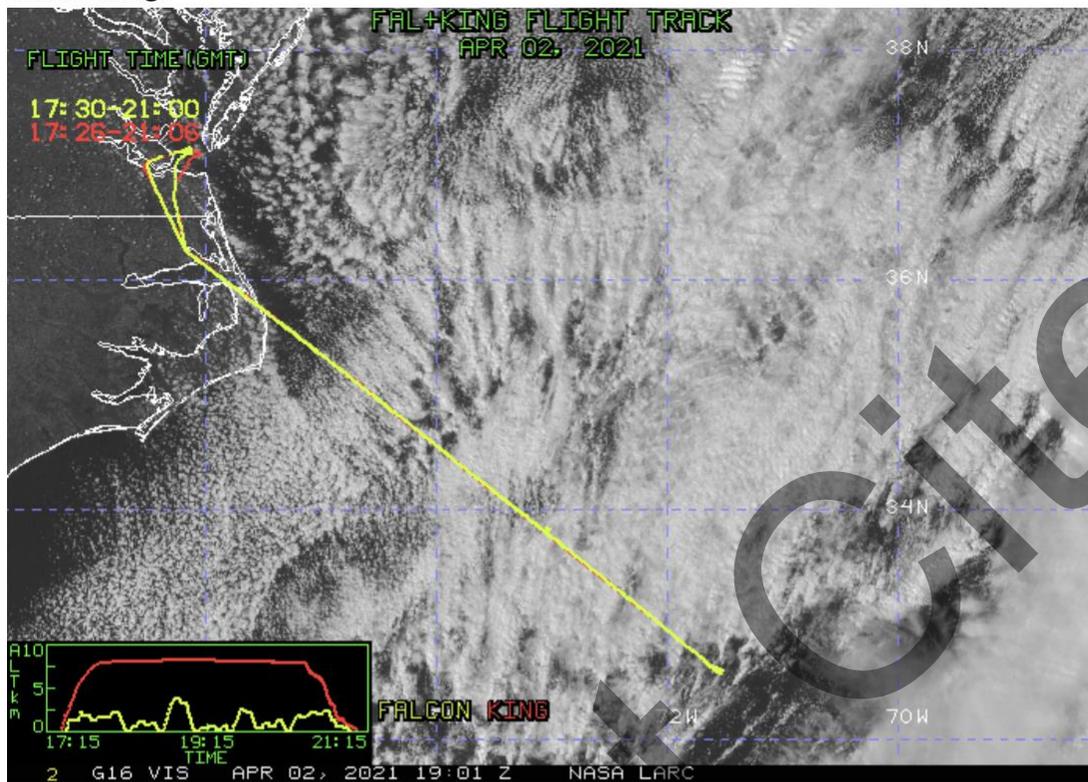


19:13 UTC

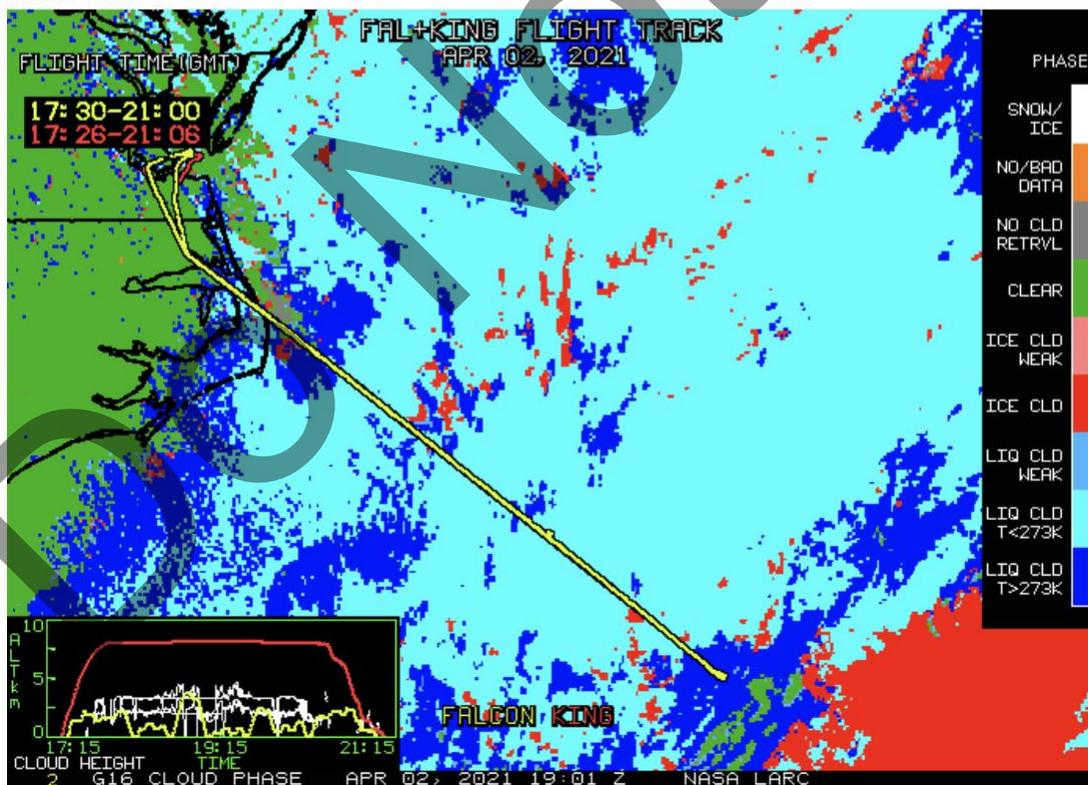
Mixed phase and pure liquid clouds with rapid transition.

NASA-LaRC Clouds Group GOES-16 Quicklook Images for Flight 61, 19:01 UTC Apr 02, 2021

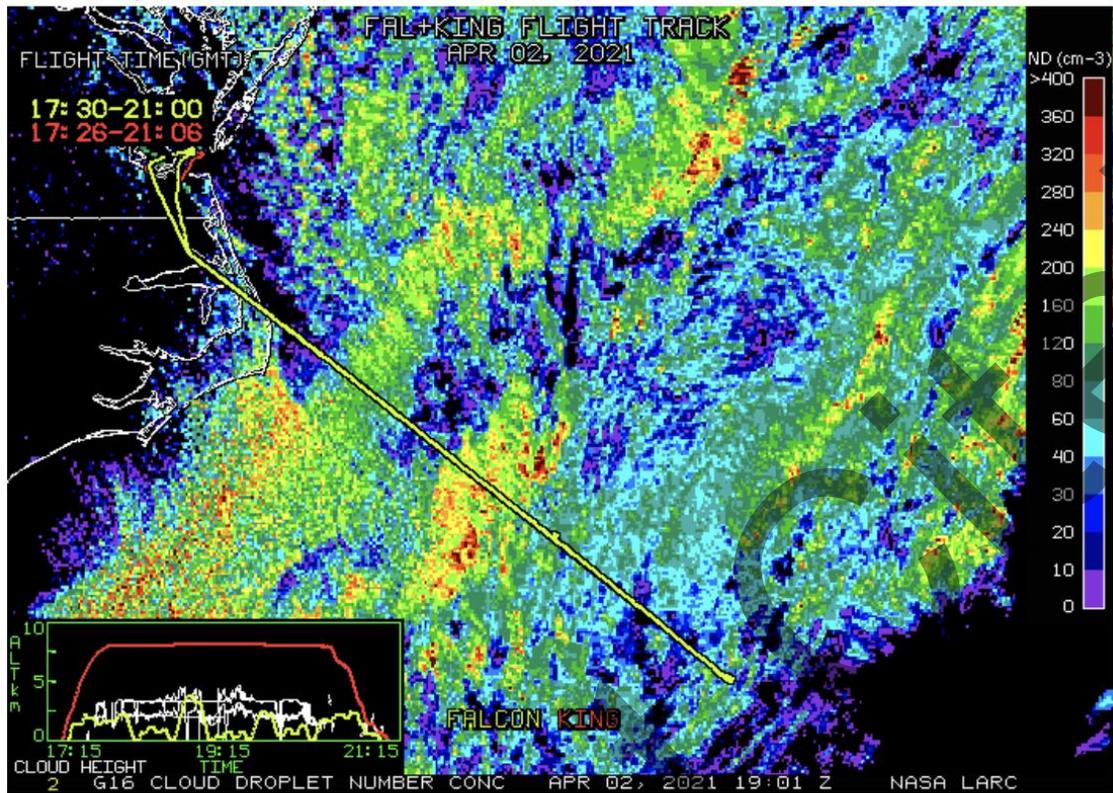
Visible Image



Cloud Phase



Cloud Droplet Number Concentration (cm-3)



Cloud-Top Height (Kft-ASL)

